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Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Office of Meteorology and Climatology **MeteoSwiss**

Climate Change Scenarios for Switzerland – the approach chosen for CH2011 and lessons learned for the future

Mark Liniger - Climate Predictions

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Historical aspects

Climate Change and Switzerland 2050
OcCC & ProClim (2007)
→ Climate scenarios cover ~10 pages

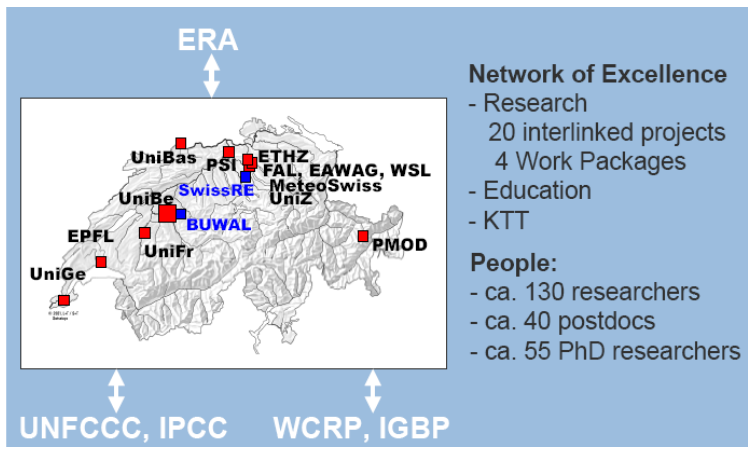




Organizational aspects

Research projects

National Centre for Competence in Research 2001 - 2013



Network of Excellence

- Research
- 20 interlinked projects
- 4 Work Packages
- Education
- KTT

People:

- ca. 130 researchers
- ca. 40 postdocs
- ca. 55 PhD researchers

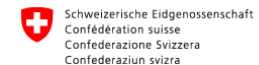


Sustainable structures

Center for Climate Systems Modeling (C2SM) 2009 -

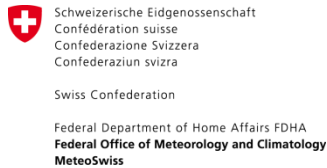


- developing and maintaining climate models
- providing climate model data
- collaboration in CH2011

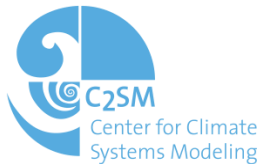
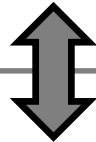




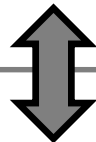
Organization CH2011



- Coordination and editorial Office
- User-tailored research products
- Verification / multi-model analysis
- Communication



- Data Service (data provision / storage)
- Common formatting and tools
- Webpage for CH2011
- Communication



ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

- Climate Model Development (e.g. RCM «CLM»)
- Methodological basis
- Physical Aspects of the Climate System
- Downscaling and extremes



Swiss Scenarios CH2011

Report, summaries, and scenario data in digital form available at:

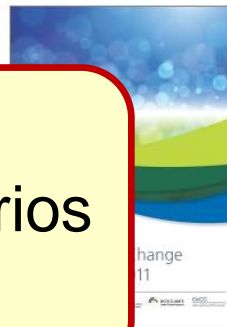
www.ch2011.ch

[deutsch](#) | [francais](#) | [italiano](#) | [english](#)

Swiss Climate Change Scenarios CH2011

The climate of Switzerland is changing. The Swiss Climate Change Scenarios CH2011 provide a new assessment of how this climate may change over the 21st century. They are based on new generations of climate models with higher resolution, improved statistical methods, and an account of all recent relevant studies as well as the assessments by the Intergovernmental Panel on Climate Change (IPCC).

Consistent set of climate change scenarios for Switzerland



[Medium resolution](#) (pdf, 17M)
[High resolution](#) (pdf, 55M)



[Summary](#) (pdf, 8.4M)

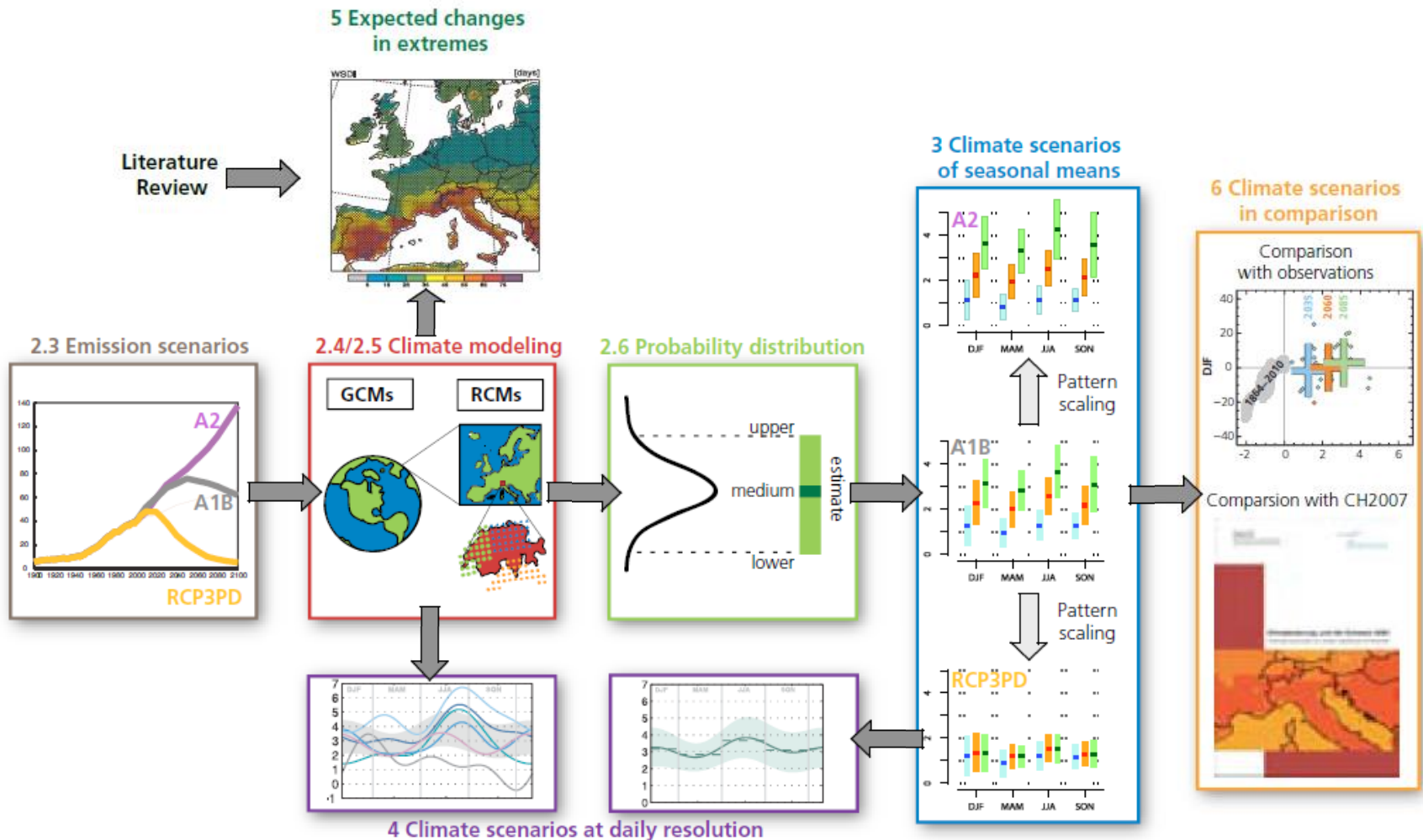
[Zusammenfassung](#) (pdf, 8.4M)
[Résumé](#) (pdf, 8.4M)
[Riassunto](#) (pdf, 8.3M)

Year	Scenario	Variable	Value	Unit	Scenario	Variable	Value	Unit
2	2.61	2.40	2.40	2.41	2.41	2.41	2.41	2.41
3	2.59	2.47	2.47	2.41	2.41	2.41	2.41	2.41
4	2.56	2.47	2.51	2.40	2.51	2.40	2.49	2.29
5	2.54	2.48	2.51	2.39	2.52	2.44	2.44	2.29
6	2.52	2.49	2.51	2.39	2.52	2.44	2.44	2.28
7	2.50	2.49	2.56	2.38	2.51	2.44	2.44	2.28
8	2.48	2.50	2.59	2.37	2.51	2.40	2.27	2.27
9	2.46	2.50	2.59	2.36	2.51	2.40	2.27	2.26
10	2.44	2.51	2.69	2.35	2.50	2.40	2.27	2.26
11	2.41	2.51	2.62	2.34	2.49	2.40	2.27	2.26
12	2.38	2.52	2.69	2.33	2.48	2.41	2.25	2.26
13	2.37	2.52	2.64	2.32	2.48	2.41	2.25	2.26
14	2.35	2.53	2.65	2.30	2.47	2.40	2.24	2.26
15	2.33	2.53	2.66	2.28	2.46	2.39	2.23	2.25
16	2.31	2.54	2.66	2.26	2.45	2.38	2.22	2.25
17	2.29	2.54	2.67	2.25	2.44	2.38	2.21	2.25
18	2.27	2.56	2.67	2.23	2.43	2.37	2.19	2.25
19	2.26	2.56	2.66	2.22	2.42	2.36	2.19	2.25
20	2.24	2.56	2.66	2.19	2.40	2.36	2.17	2.25
21	2.22	2.56	2.66	2.17	2.39	2.35	2.15	2.25
22	2.20	2.56	2.66	2.15	2.38	2.32	2.14	2.25
23	2.19	2.56	2.66	2.13	2.37	2.31	2.12	2.25
24	2.17	2.56	2.66	2.11	2.35	2.29	2.11	2.25
25	2.16	2.57	2.66	2.10	2.34	2.28	2.09	2.25
26	2.14	2.57	2.67	2.07	2.32	2.26	2.07	2.25
27	2.13	2.57	2.66	2.06	2.31	2.25	2.06	2.25
28	2.11	2.58	2.66	2.03	2.29	2.23	2.04	2.25
29	2.11	2.58	2.65	2.00	2.28	2.22	2.03	2.25
30	2.10	2.58	2.64	1.97	2.26	2.20	2.00	2.25
31	2.09	2.58	2.63	1.95	2.25	2.17	1.99	2.25
32	2.08	2.59	2.62	1.93	2.23	2.17	1.96	2.25
33	2.07	2.59	2.61	1.90	2.21	2.15	1.94	2.25
34	2.06	2.59	2.59	1.88	2.20	2.14	1.92	2.25
35	2.05	2.59	2.58	1.85	2.17	2.12	1.90	2.25
36	2.05	2.59	2.58	1.83	2.17	2.10	1.88	2.25
37	2.04	2.59	2.56	1.83	2.16	2.08	1.86	2.25
38	2.03	2.59	2.55	1.81	2.14	2.07	1.84	2.25

[Data download](#)



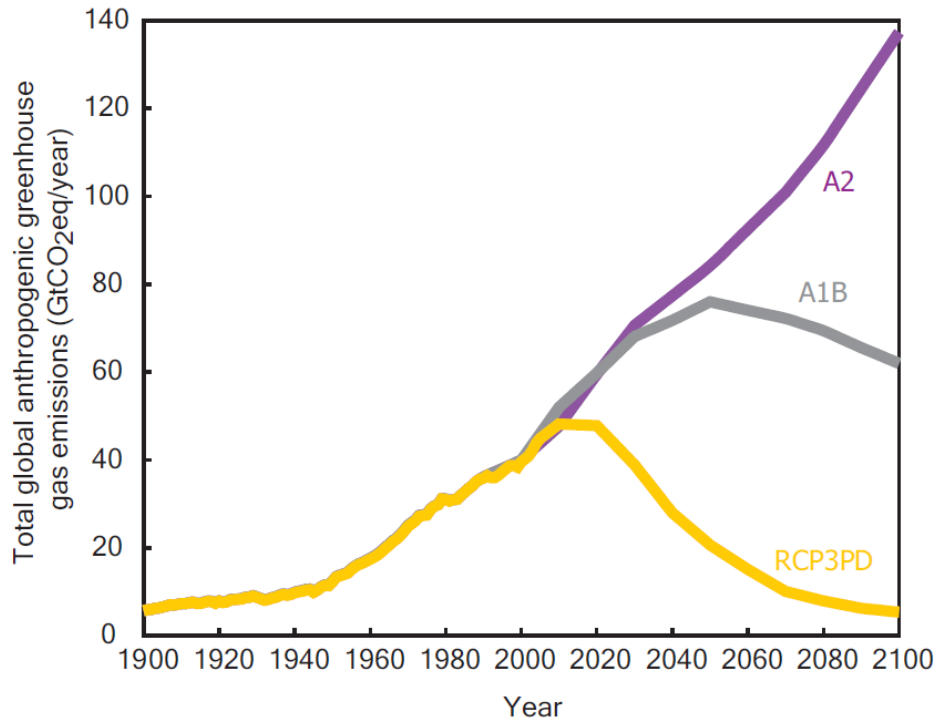
Method overview



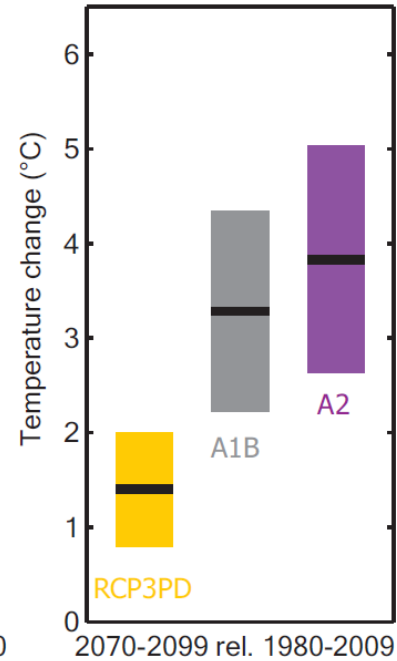


Results

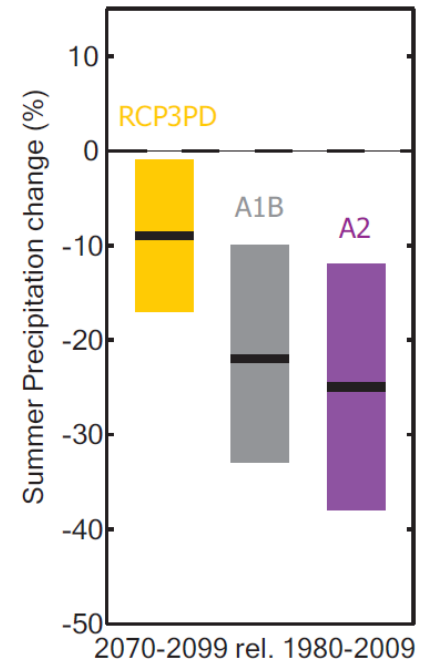
Global greenhouse gas emissions



Temperature change (in °C) by 2085

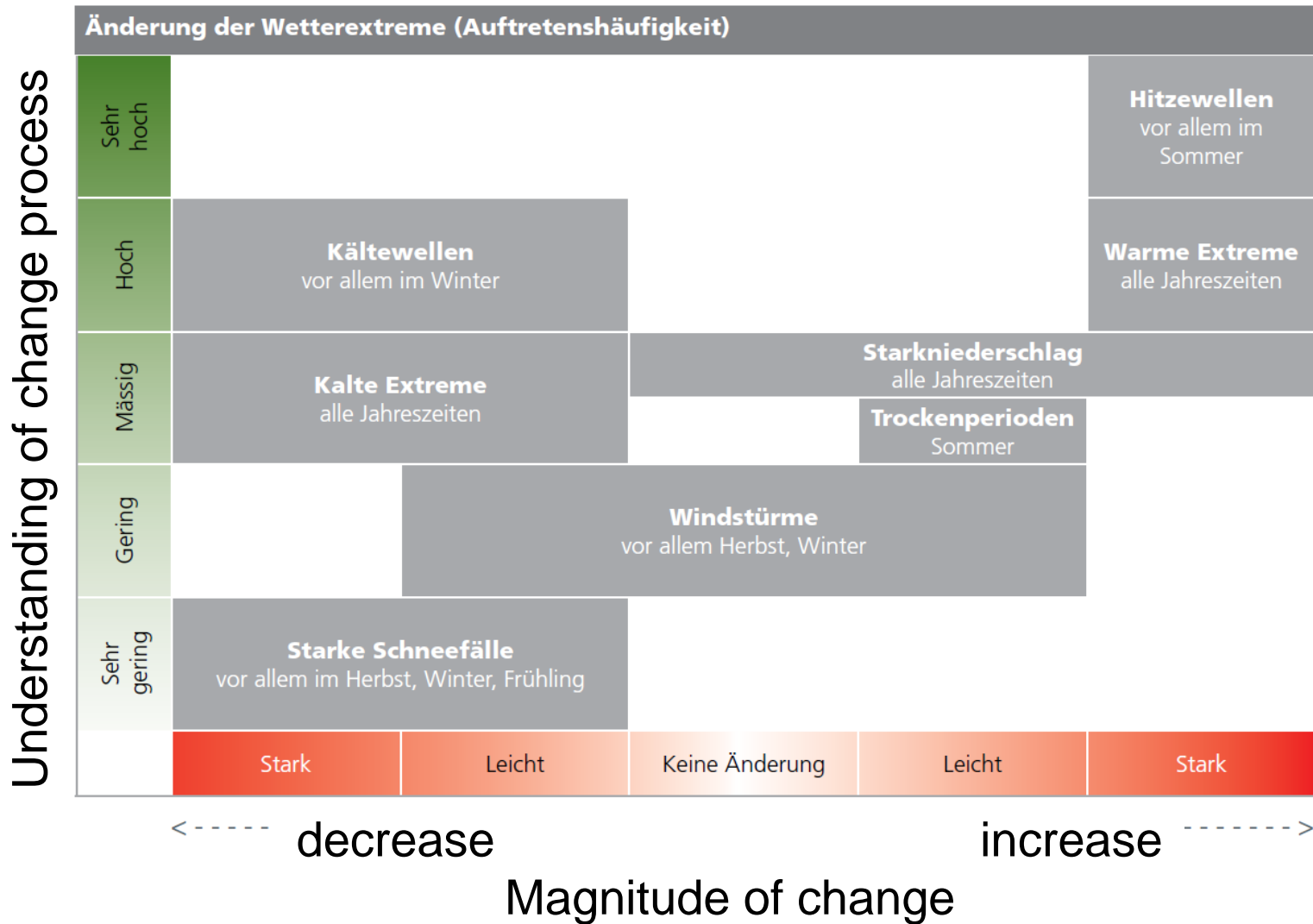


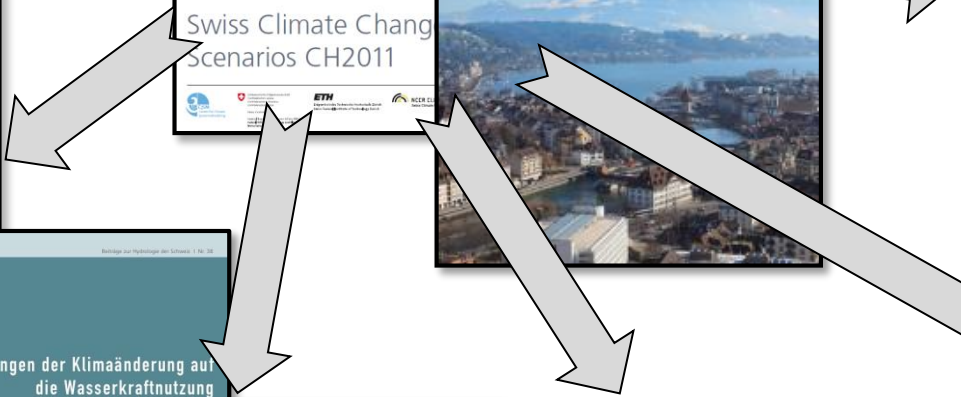
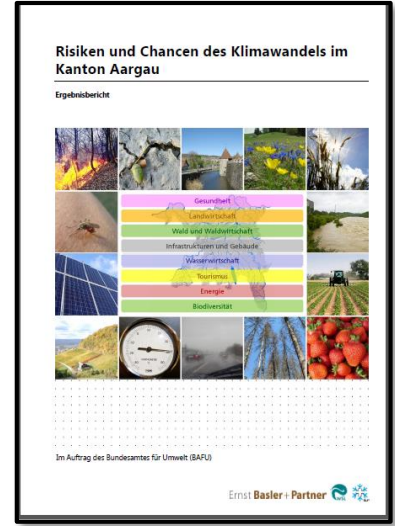
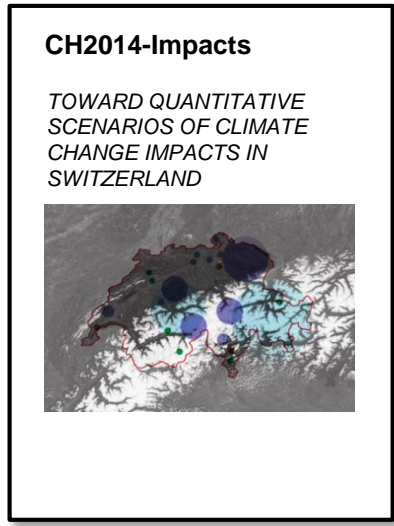
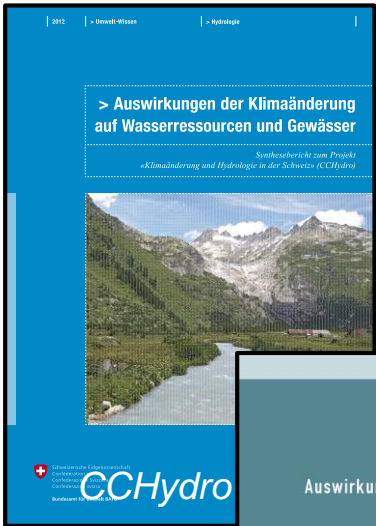
Change in summer precipitation (in %) by 2085





Summary on extremes





Federal Climate Change Adaptation Strategy

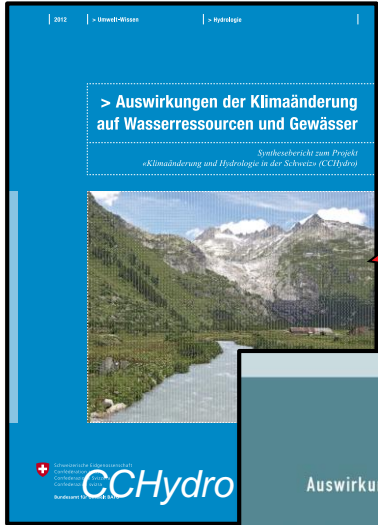
hydrology

hydropower

Water resources (drought)

Climate Impacts Report ("WG2")

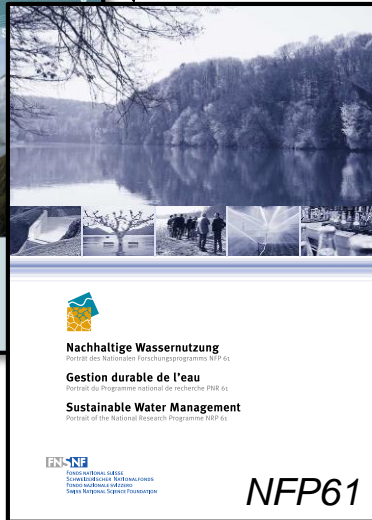
Regional risk analysis of climate change



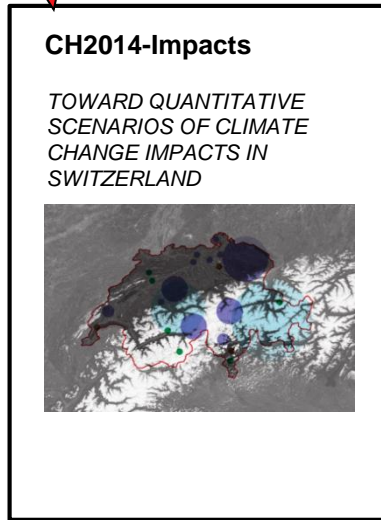
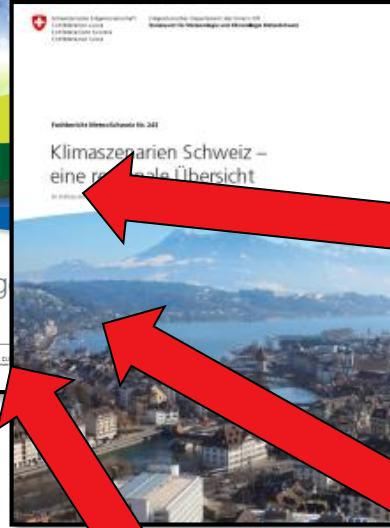
hydrology



hydropower



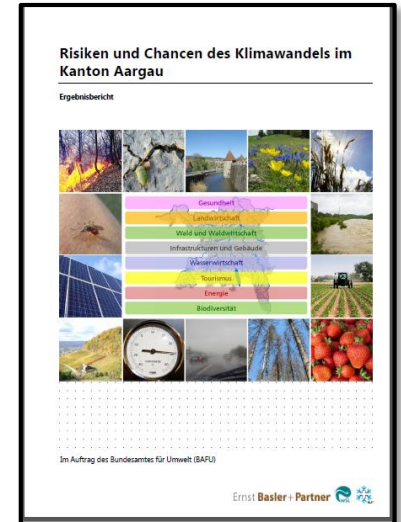
Water resources (drought)



Climate Impacts Report ("WG2")



Federal Climate Change Adaptation Strategy



Regional risk analysis of climate change





Political recognition of climate adaptation needs

Adoption of “Aktionsplan Anpassung an den Klimawandel” by federal council in April 2014

Regular update of regional climate scenarios for Switzerland

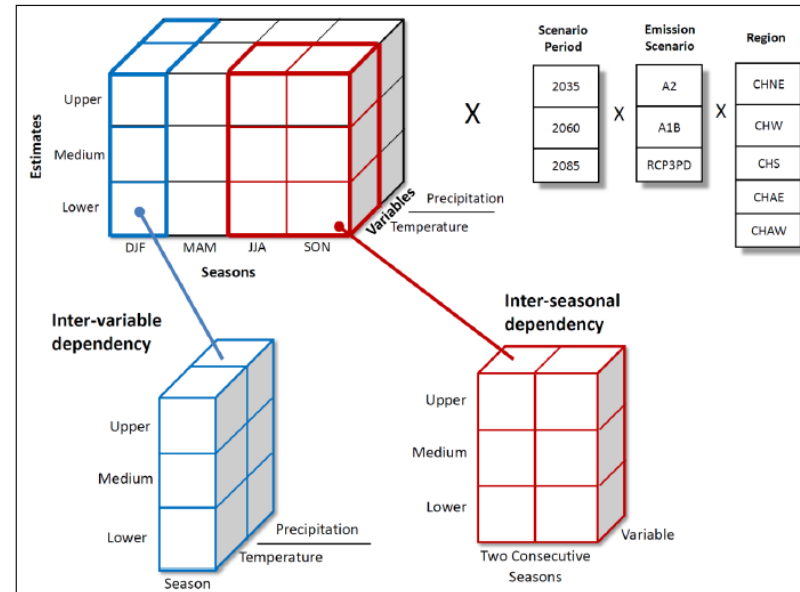
- **Coordination** in close collaboration with experts of academic sector.
- **Regionalization** for specific locations and sectoral needs.
- Communication and **dissemination** of scenarios and corresponding infrastructure.
- Limited funding for MeteoSwiss to fulfill new mandate and secure collaboration with academic sector.





CH2011 Extension series

How to combine seasonal changes?



Fischer et al. (2015)

- Consistent to CH2011
- Based on published methods (mainly CH2011)
- data extensions
- Internal review

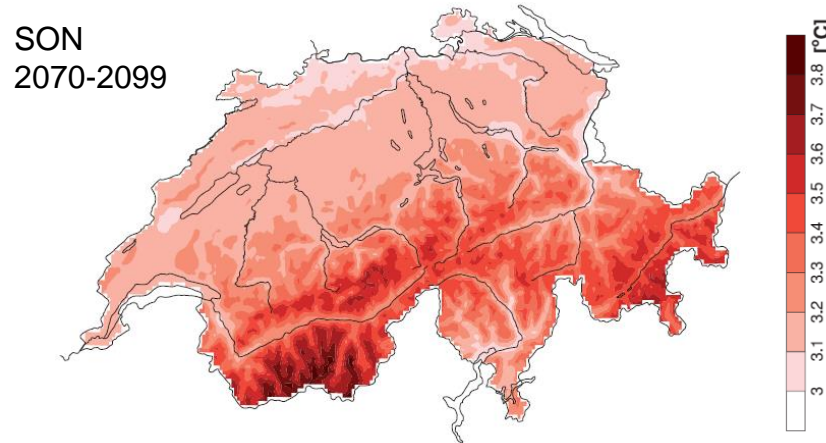




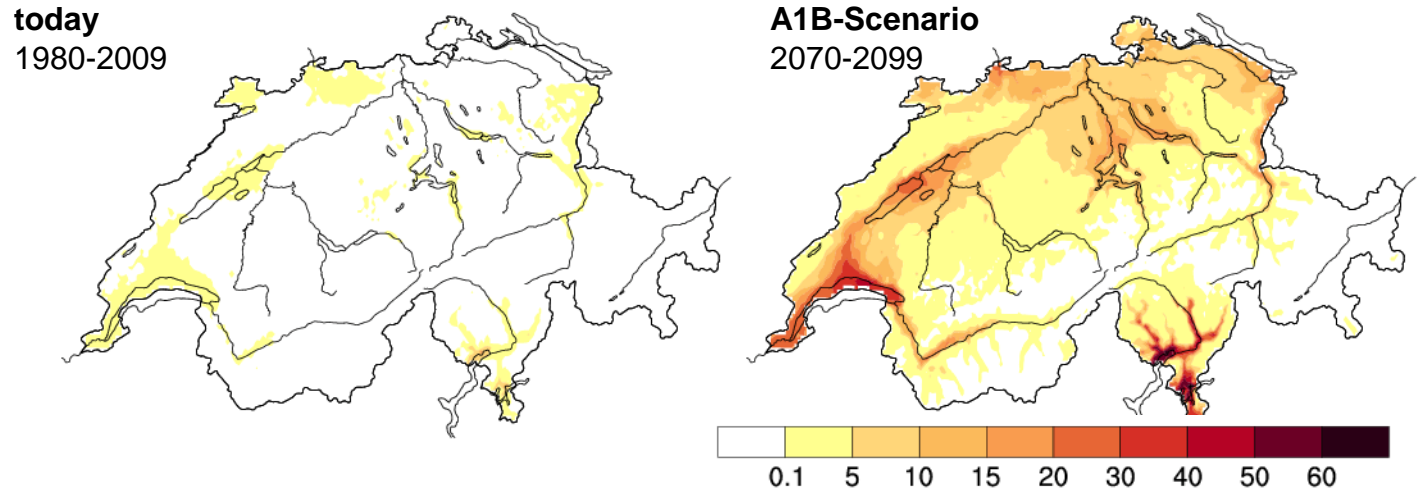
Follow up peer review publications

User specific indices

Spatial
disaggregation



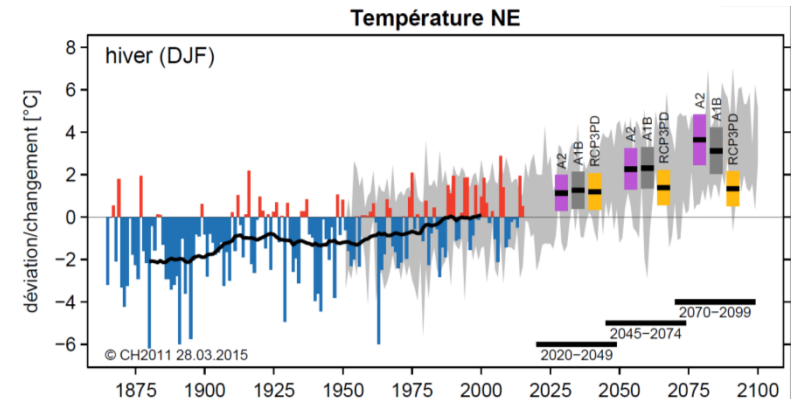
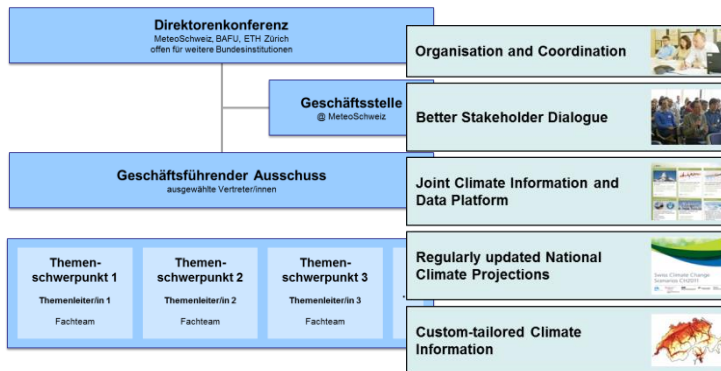
delta change on
gridded daily obs





Climate services

- User specific studies
- Operational climate monitoring taking into account climate change
- National climate scenarios as part of the National Centre for Climate Services (NCCS)





Lessons learned

- There is a high demand in **consistent** and **consolidated** climate change scenarios on a national level.
- Internationally coordinated climate modeling experiments and IPCC reports are key prerequisite.
- Academic research and institutional bodies have to work hand in hand
 - Linking science with sustainable structures.
- Methods must be ready and published before the writing and consolidation phase.
 - Internal and external review process is very demanding and very fruitful.
- After publishing is before publishing:
Dialogue must be kept running continuously
- Danger of a 'user need bubble'

CH2018



Eli Pariser, TED